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ABSTRACT

The paper reviews research which views the inappropriate behavior of children with autism from a pragmatics perspective and suggests a classroom-based tool for analyzing behaviors and planning interventions. The pragmatics premise is that all behavior reflects the individual's attempts to interact and communicate. The pragmatics perspective, then, considers the functional role of bizarre behaviors rather than a strictly behavioral dynamic view. A pragmatics-oriented assessment tool is proposed which groups functions of behavior into five main categories: requests, negations, declarations/comments, declarations about feelings, and non-interactive functions. Evaluators form and test hypotheses regarding function-behavior relationships based on examination of the context. Interventions based on analysis fall into two general categories: communication training strategies and behavior management strategies. A case study illustrates the approach with a 7-year-old autistic child. Appendices list definitions of behavioral and functional categories. (CL)

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A TASK FORCE REPORT ON ANALYSIS OF THE COMMUNICATIVE FUNCTIONS OF BEHAVIOR[1]

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The behavioral repertoires of many individuals with autism and other severely handicapping conditions include a significant number of behaviors considered to be inappropriate, bizarre, meaningless, and/or undesirable. These include, for example, self-injurious behavior, self-stimulatory behavior and echolalia. A powerful technology for managing such behaviors has been developed over the past two decades, and the result is that both researchers and educators now have available many effective procedures for decreasing or eliminating undesired behavior in clinic, classroom, and residential settings.

Behavior management interventions designed to decrease inappropriate behavior can be grouped into two main categories:

Contingency management interventions. These are interventions based primarily on analyses of the consequences supporting the undesirable behaviors. Interventions based on such analyses involve manipulation of consequences for the express purpose of decreasing the behaviors of concern. This has traditionally been accomplished through the use of behavioral interventions such as extinction (Baumeister & Forehand, 1971; Jones, Simmons, & Frankel, 1974; Rincover & Devaney, 1982); time out from positive reinforcement (Hamilton, Stephens, & Allen, 1967; Solnick, Rincover, & Peterson, 1977); differential reinforcement of incompatible (DRI) or other (DRO) behavior (Repp & Deitz, 1974; Russo, Cataldo, & Cushing, 1981); overcorrection (Foxx & Azrin, 1973; Rollings, Baumeister, & Baumeister, 1977); and aversive stimulation (Lovaas, Schaeffer, & Simmons, 1965; Dorsey, Iwata, Ong, & McSween, 1980).

Antecedent management interventions. These are interventions based primarily on analyses of the antecedents which set the occasion for the behaviors of concern. Based on these analyses, the antecedents are altered to preclude or reduce the likelihood that the undesired behaviors will occur, usually through manipulating curricular and ecological variables. Such interventions have included, for example, alteration of: instructional environments (Frankel, Freeman, Ritvo, & Pardo, 1978); instructional materials (Berkson & Mason, 1963; Davenport & Berkson, 1963; Favell, McGimsey, & Schell, 1982); verbal directions (Carr, Newsom, & Binkhoff, 1976); and the reinforcement value of tasks (Center, Deitz, & Kaufman, 1982; Gaylord-Ross, Weeks, & Lipner, 1980; Weeks & Gaylord-Ross, 1981). A range of other antecedent and ecological factors was also discussed by Etzel and LeBlanc (1979).

Whichever strategy is used, the intervention is typically selected based on an individualized objective behavioral analysis of the stimulus events occurring before or immediately after the undesired response. This type of analysis seems critical for the selection of an appropriate intervention (Carr, 1977; Durand, 1982; Frankel et al., 1978; Gaylord-Ross, 1980; Gaylord-Ross et al., 1980; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982; Romanczyk & Kistner, 1982), since the behavioral dynamics supporting even topographically-similar responses can vary widely across individuals. In such an analysis, the behaviors of concern are usually treated as aberrant, nonfunctional responses which serve no purpose outside of the operant analysis. That is, behaviors are viewed as either motivated solely by a drive for attention, escape/avoidance, or internal arousal; or as stemming

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from internal organic variables beyond the individual's control (e.g., pain- or seizure-related aggression)(Carr, 1977).

Aside from the motivational sources determined by a behavioral analysis, researchers and clinicians have been hesitant to assign functional properties to aberrant behaviors from a broader, less operant perspective. While this is an understandable reaction against the highly interpretive, psychodynamic view of aberrant behavior in the past (e.g., Beres, 1952; Cain, 1961; Hartman, Kris, & Loewenstein, 1949), such a rigid framework precludes consideration of the possible pragmatic aspects of behavior in a communicative context. The purpose of this paper is to review the recent literature which views the "inappropriate" behaviors of individuals with autism in particular from a pragmatics perspective, and to discuss some of the advantages of this approach. In addition, a simple classroom-based tool and protocol for analyzing behaviors and planning interventions related to their functional properties will be described and discussed.

The Pragmatic Analysis of Autistic Behavior

Recently, several researchers have become increasingly aware of the value of viewing the behavior of autistic and other severely handicapped children from a pragmatics perspective (e.g., Miller, 1978; Prutting, 1982; Prizant & Duchan, 1981; Schuler & Goetz, 1981). The basic premise of a pragmatic analysis of behavior is that all behavior, aberrant or not, is reflective of the individual's attempts to interact and communicate (Schuler, 1980; Schuler & Goetz, 1981; Watzlawick, Beavin & Jackson, 1967). While a strictly operant analysis focuses on the environmental or physiological events supporting the behavior of concern, a pragmatic analysis focuses on the communicative message of the behavior in context. Prutting (1982) noted that "there is a growing tendency to describe the disordered child's qualitative as well as quantitative differences in comparison to the normal child....Qualitative differences may well be compensatory strategies developed for (communicative purposes)."

When applied to the behavior of individuals with autism, the central question in this type of analysis is "What is the individual communicating?" rather than "How did the individual learn to act inappropriately?". The former question requires that the practitioner adopt the attitude that autistic individuals are communicators, though the topography of their communications might be unusual and non-traditional. This is not the commonly-accepted view of autistic individuals, who are usually regarded as non-communicative, stubborn, detached, and isolated. However, as Frankel (1982) noted,

> If autistic individuals were truly incapable of engaging in human social relations, one would expect their behavior to be unaffected by outside stimuli and to produce no effect on others. Since neither assumption seems to be true, it makes good analytic sense to examine the behavior of autistic children not only as individuals but also as persons in interaction (p. 41-42).

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Viewed in this light, it should be possible to analyze, describe, and understand the puzzling and often bizarre behaviors of autistic individuals as indicative of their attempts to interact and communicate.

An example of the benefits of a pragmatic approach can be found by examining the treatment history of echolalic behavior. In his original paper describing the syndrome of autism, Leo Kanner (1943) noted that the children he studied frequently used both delayed and immediate echolalia to request an action from others or to answer "yes" to a question:

> Affirmation is indicated by literal repetition of a question....The child, once told by his mother, "Now I will give you your milk", expresses the desire for milk in exactly the same words....If the mother's original remark has been made in the form of a question, it is reproduced with the grammatical form and the inflection of a question. The repetition "Are you ready for your dessert?" means that the child is ready for his dessert (p. 243-244).

Kanner's insightful analysis of the communicative functions of echolalia has been largely ignored by behaviorally oriented researchers, who analyze echolalia from an operant perspective and advocate the extinction, punishment, or replacement of echolalic behaviors through the use of behavioral interventions (Carr, Schreibman, & Lovaas, 1975; Lovaas, 1977; Risley & Wolf, 1967). Recent research, however, has challenged this interpretation and approach. Researchers operating from a pragmatics framework have identified several communicative and interactive functions of echolalia, and have suggested that only a small percentage of echolalic responses are truly nonfocused and nonfunctional (Fay, 1969; Paccia & Curcio, 1982; Prizant & Duchan, 1981; Shapiro, 1977). Thus, these authors suggest that the indiscriminate elimination of echolalic behavior through behavioral interventions is inappropriate, since individuals with autism may rely on echolalia as a viable, if unusual, means of communication and interaction. Prizant (1978), for example, stated that, at least for some autistic children "...it would be advisable to accept and exploit immediate echolalia and help the child relate such repetitions to aspects of the environment and communicative interactions" (p. 175-176).

The case of echolalia is illustrative of both the differences between the two approaches and some of the advantages of a pragmatics approach to analyzing behavior. It is important to note that such an approach does not imply "acceptance" of bizarre behaviors simply because they are functional to the individual and understandable to the practitioner. Once the communicative/interactive functions of a particular behavior for the individual are determined, an intervention program to modify the behavior is typically in order. The difference in approach, however, is that such a program would presumably be designed primarily around the function of the behavior, rather than strictly around the behavioral dynamics of the behavior. Durand (1982) illustrated such an approach in his discussion of a functional strategy for intervention regarding self-injurious behavior:

> Say, for example, a child is found to be hitting himself to avoid demanding tasks. Perhaps by teaching appropriate verbal response (e.g., "Help me") the child could learn to lessen the aversiveness of the task (i.e., requesting teacher prompts) in a more appropriate manner. This should lead to less self-injury, since the self-injurious behaviors should become less efficient in obtaining the preferred reinforcer (e.g., escape from demands) (p. 52).

Another approach for this same child might involve a reconsideration of the relevance of the task and its reinforcing properties. A reassessment of and change in the curriculum might be indicated as the result of such an analysis, in an attempt to preclude the behavior by providing a more stimulating, less aversive set of task demands. Both of these interventions acknowledge the legitimacy of the self-injurious behavior as a communicative act in context, and seek to either replace or prevent the response through positive programming strategies (Lovaas, 1982; LaVigna & Donnellan-Walsh, 1976; Mesaros, Donnellan & LaVigna, in press).

An Assessment Tool to Analyze The Communicative Functions of Behavior

An analysis of the communicative intent of aberrant behavior requires that several conditions be met:

1. The practitioner must have the opportunity to observe and interact with the individual of interest over a period of time on a regular basis. Parents and educators of persons with autism are quite aware that it is difficult to appreciate and understand their behaviors unless this basic requirement is met (Park, 1982; Prizant, 1978; Silverman, 1982).

2. The behaviors of concern must be observed in a variety of environments, including educational, community, and home settings. A pragmatic analysis attempted in only one environment may not provide the information necessary to pinpoint all the functions of a particular behavior. This may be particularly true if the practitioner neglects to observe the child in his/her home (Anderson, 1982).

3. The assessment of the communicative functions of behavior must be made on an individual basis after consideration of the behaviors of concern in context, and must reflect an attempt to objectively validate the conclusions drawn. Without these critical elements, the practitioner has no means for controlling the highly variable and interpretive nature of the analysis.

In order to facilitate the ease of such an analysis, a tool was developed for use by a team of researchers, parents, educators, and speech-

language clinicians involved with autistic individuals (see Figure 1). The behaviors are listed across the top of the tool and arranged in alphabetical order in four groupings. The groupings are, from left to right:

-behaviors which are "likely to be inappropriate" topographically, judged against the standard of social acceptability;

-physical behaviors which "can be either socially appropriate or socially inappropriate", depending on the context;

-vocal behaviors which "can be either socially appropriate or socially inappropriate", depending on the context; and

-behaviors which are "likely to be appropriate", judged against the standard of social acceptability.

Thus, behaviors such as aggression, self-injurious behavior and self-stimulation appear on the extreme left of the instrument, and behaviors involving the use of speech, signs, pictures, and written words to communicate appear on the extreme right. The behavioral categories were based on inventories of the behaviors of the individuals with autism with whom the task force members interact on a regular basis. Definitions of the behavioral categories appear in Appendix 1.

The "functions of behavior" categories are grouped into five main sections: Requests, Negations, Declarations/Comments, Declarations about Feelings, and Non-Interactive Functions. The sub-categories were derived from several different taxonomies of the communicative functions of speech and language in non-handicapped children (Coggins & Carpenter, 1981; Dore, 1975; Halliday, 1975; see Chapman, 1981, for an extensive review of this literature). Definitions for each of the sub-categories can be found in Appendix 2. It should be noted that the sub-categories regarding "expression of feelings" are normally used only in conjunction with at least one other, more objectively determinable function. Thus, the practitioner might decide that a behavior (e.g., self-stimulation) is used simultaneously for entertainment purposes and to express boredom with the ongoing activity.

Strategies for Using the Tool to Gather Information

A flow chart illustrating a strategy for using the tool to analyze communicative functions is presented in Figure 2. Basically, the tool can be used either to conduct a general survey of all functions and their related behavioral manifestations, or to conduct a general survey of all behaviors and the functions they serve. The former analysis might be useful, for instance, to determine the communicative needs of an individual prior to designing an augmentative communication system; to gather initial assessment information; and for use by parents to describe the student's communication needs in the home. The latter type of analysis, on the other hand, would typically be done to obtain pragmatic information before designing a functionally-related behavior management strategy.

In either case, once the function(s) or behavior(s) of interest have

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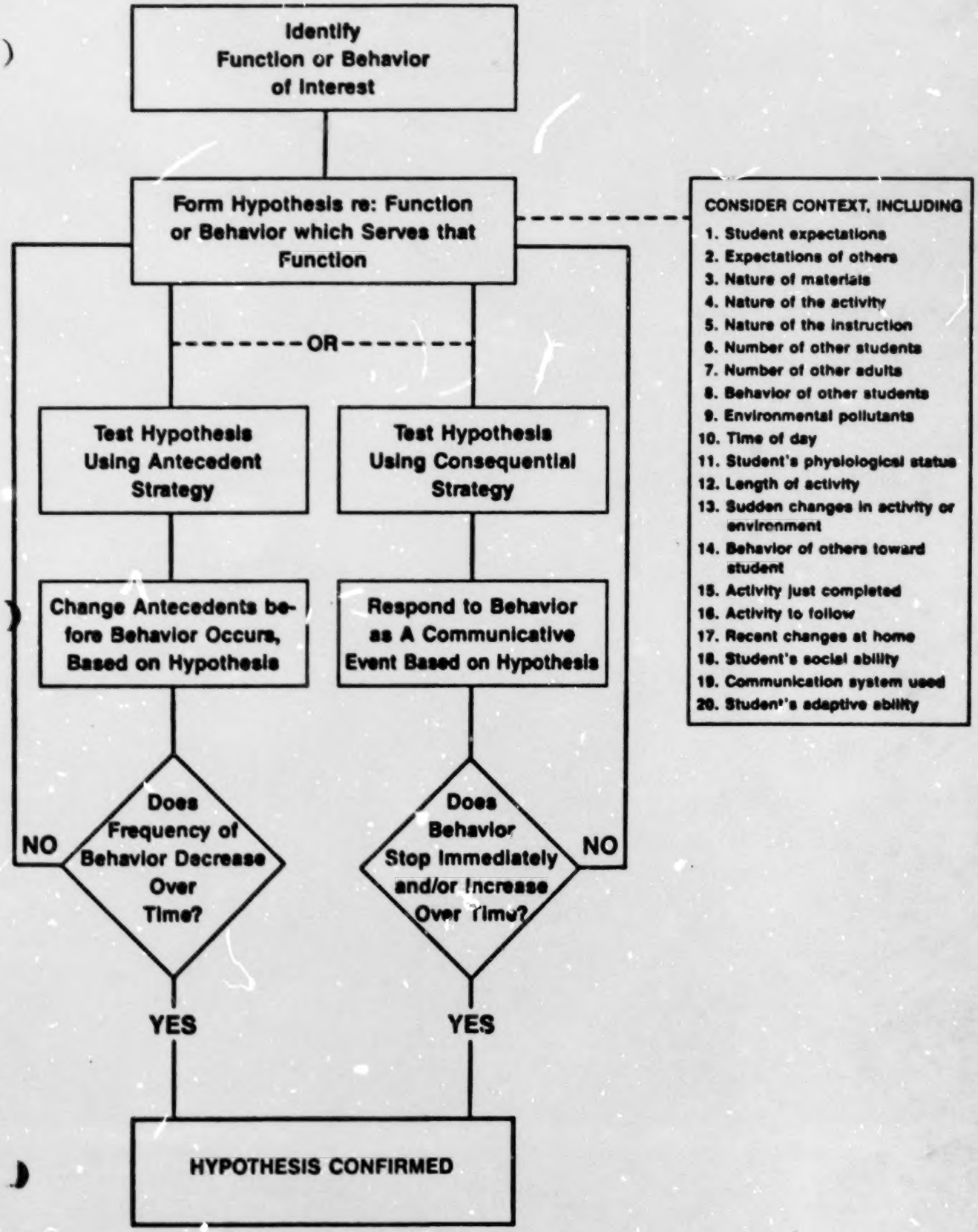
FIGURE 1. ASSESSMENT TOOL FOR ANALYZING THE COMMUNICATIVE FUNCTIONS OF BEHAVIOR

FUNCTIONS \ BEHAVIORS	• AGGRESSION	• BIZARRE VERBALIZATIONS	• INAPP. ORAL / ANAL BEHAVIOR	• PERSEVERATIVE RITUALS	• SELF-INJURIOUS BEHAVIOR	• SELF-STIMULATION	• TANTRUM	• FACIAL EXPRESSION	• GAZE AVERSION	• GAZING / STARING	• GESTURING / POINTING	• HUGGING / KISSING	• MASTURBATION	• OBJECT MANIPULATION	• PROXIMITY POSITIONING	• PUSHING / PULLING	• REACHING / GRABBING	• RUNNING	• TOUCHING	• DELAYED ECHOLALIA	• IMMEDIATE ECHOLALIA	• LAUGHING / GIGGLING	• SCREAM / YELL	• SWEARING	• VERBAL / PHYSICAL THREATS	• WHINING / CRYING	• COMPLEX SIGN / APPROXIMATION	• COMPLEX SPEECH APPROXIMATION	• ONE WORD SIGN / APPROXIMATION	• ONE WORD SPEECH / APPROX.	• PICTURE / WRITTEN WORD	• • •
I. INTERACTIVE																															
A. REQUESTS FOR																															
Attention																															
Social Interaction																															
Play Interactions																															
Affection																															
Permission to Engage in an Activity																															
Action by Receiver																															
Assistance																															
Information / Clarification																															
Objects																															
Food																															
B. NEGATIONS																															
Protest																															
Refusal																															
Cessation																															
C. DECLARATIONS/COMMENTS																															
About Events / Actions																															
About Objects / Persons																															
About Errors / Mistakes																															
Affirmation																															
Greeting																															
Humor																															
D. DECLARATIONS ABOUT FEELINGS																															
Anticipation																															
Boredom																															
Confusion																															
Fear																															
Frustration																															
Hurt Feelings																															
Pain																															
Pleasure																															
II. NON-INTERACTIVE																															
A. SELF-REGULATION																															
B. REHEARSAL																															
C. HABITUAL																															
D. RELAXATION / TENSION RELEASE																															

Student: _____ Date: _____ Time: _____

Activity: _____

FIGURE 2. STRATEGIES FOR USING THE TOOL TO ANALYZE COMMUNICATIVE FUNCTIONS OF BEHAVIOR


Identify Function or Behavior of Interest
Form Hypothesis re: Function or Behavior which Serves that Function
OR
Test Hypothesis Using Antecedent Strategy
Test Hypothesis Using Consequential Strategy
Change Antecedents before Behavior Occurs, Based on Hypothesis
Respond to Behavior as A Communicative Event Based on Hypothesis
Does Frequency of Behavior Decrease Over Time?
Does Behavior Stop Immediately and/or Increase Over Time?
NO
NO
YES
YES
HYPOTHESIS CONFIRMED
CONSIDER CONTEXT, INCLUDING
1. Student expectations
2. Expectations of others
3. Nature of materials
4. Nature of the activity
5. Nature of the instruction
6. Number of other students
7. Number of other adults
8. Behavior of other students
9. Environmental pollutants
10. Time of day
11. Student's physiological status
12. Length of activity
13. Sudden changes in activity or environment
14. Behavior of others toward student
15. Activity just completed
16. Activity to follow
17. Recent changes at home
18. Student's social ability
19. Communication system used
20. Student's adaptive ability

been identified, the practitioner forms a hypothesis regarding function-behavior relationships. In order to do this, the context in which the observable behaviors occur must be examined, and at least the following factors must be considered for the particular individual of concern:

1. student expectations re: the environment;
2. expectations of others, concerning the student;
3. nature of the materials available to student (reinforcement value, preference value, etc.);
4. nature of the activity in which the student is engaged (difficulty level, reinforcement value, preference value, functional appropriateness, etc.);
5. nature of the instructions given to the student (clarity, tact/mand, saliency, etc.);
6. number of other students present;
7. number of adults present;
8. behavior of other students at the time;
9. behavior of adults toward target student and others;
10. environment pollutants (noise, pollutants, crowding, etc.);
11. time of day;
12. physiological state of student (hunger, medication, seizures, pain, etc.);
13. length of activity;
14. sudden changes in environment or schedule;
15. activity just completed;
16. activity to follow present task;
17. recent changes at home or in the family of which the student might be aware;
18. individual student social ability;
19. individual student communicative ability (e.g., speech, signs, written words, pictures); and
20. individual student adaptive ability.

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These factors define the context in which the behavior occurs. In order to form a functional hypothesis, the practitioner must ask the question "In the present context, what does the student seem to be communicating and how does he/she do so?". By observing and interacting with students in various types of environments and situations, a series of hypotheses can be formulated in this manner.

The next phase of the analysis is the critical hypothesis-testing phase of the analysis. Having formed a hypothesis about the communicative intent or functions of certain behaviors in a particular context, the practitioner attempts to test the hypothesis by manipulating either the antecedent or consequential events surrounding the occurrence of the behavior. When the antecedent strategy is used, the practitioner attempts to preclude the behavior from occurring by altering relevant stimulus variables in the setting before the behavior occurs. For example, suppose that a student begins to display self-stimulatory behaviors (e.g., rocking, finger flicking) consistently after a minimum of five minutes in a particular group activity in the classroom. The practitioner might hypothesize that the self-stimulation is the student's expression of a request for termination of the activity related to boredom. To test this hypothesis, the practitioner might decide to alter the activity antecedently, by providing the student with more reinforcing and relevant activities, which should preclude the self-stimulatory behavior. Or, the practitioner might decide that the student will be allowed to leave the activity after three minutes of participation but before self-stimulation begins. If either of these strategies is implemented over a few sessions, and self-stimulation is precluded (i.e., the frequency of the self-stimulatory behavior decreases in this context), the hypothesis has been supported. If not, a new hypothesis is formed and tested accordingly.

The alternative hypothesis-testing strategy involves responding to the behavior after it occurs over a period of time, based on the hypothesized function. The behavior is thus acknowledged as a communicative event in order to test the hypothesis. Consider, for instance, an individual who tantrums at least once a day at home, at various times of the day. After observation of the tantrums, the practitioner might hypothesize that the tantrums serve the function of requesting food, perhaps because of the times of day during which they occur. Use of the consequential testing strategy would require that the individual be given food at the first signs of tantrum behavior. If the behavior ceases (i.e., the tantrum is terminated), or if the frequency of preliminary tantrum behaviors increases over time, the hypothesis is supported. Obviously, this strategy involves more risk than does the antecedent strategy, since it requires that the practitioner reinforce the beginning signs of the behavior by responding to the hypothesized communicative intent. The choice of the hypothesis-testing strategy must be individually determined, depending on the behavior and its context. Whichever strategy is used, it must be emphasized that the information gathered is used for assessment purposes in order to plan interventions; the strategies are not themselves interventions.

Strategies for Planning Interventions

A number of interventions can flow directly from the analysis. These fall into two general categories: communication training strategies and behavior management strategies. Figure 3 illustrates a general approach which can be used after the functional analysis is completed in order to plan communication training or behavior management programs based on this information.

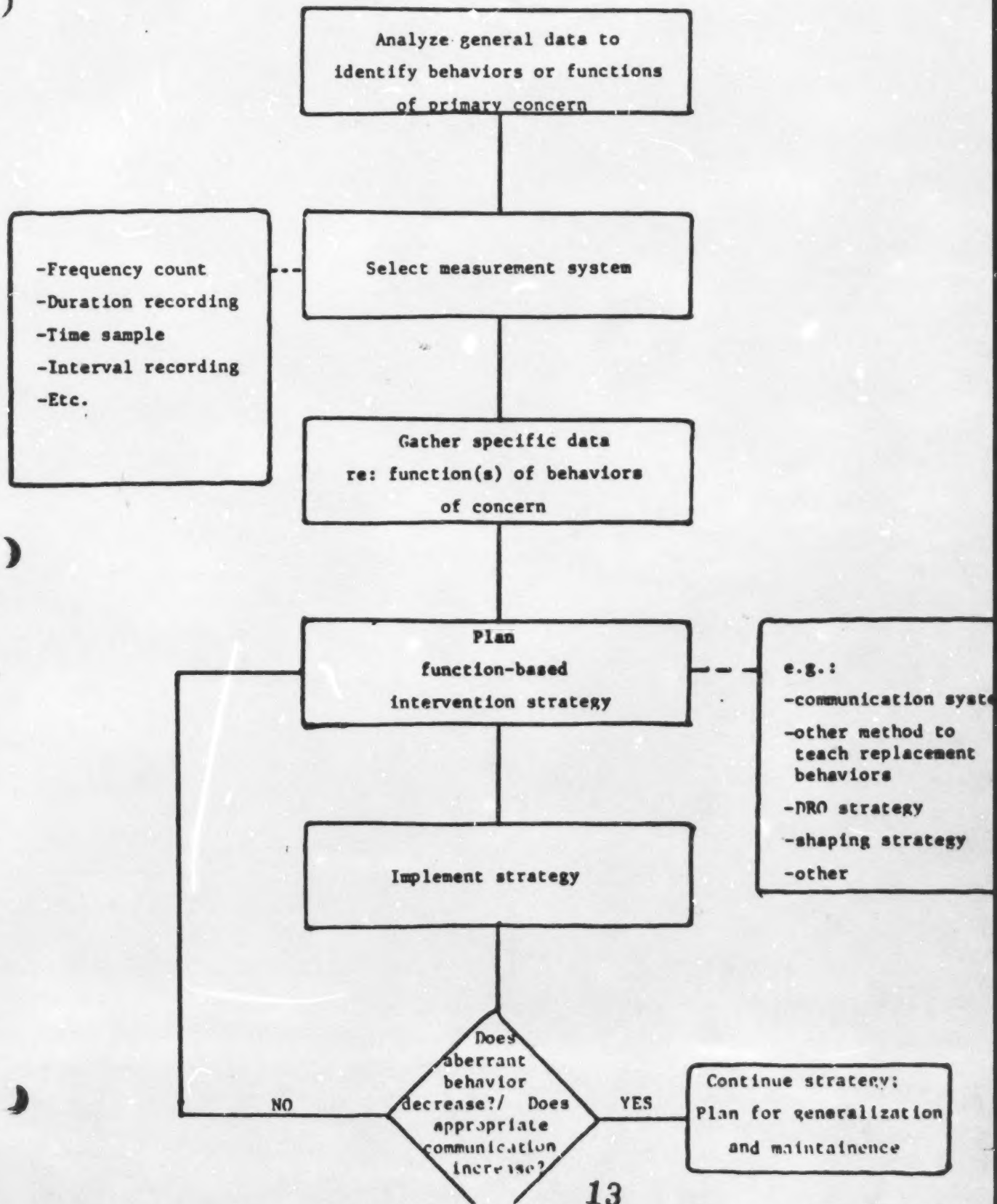
Communication Training Strategies

As noted previously, the tool can be used to gather functional information about the communicative behaviors of a particular student in order to implement an individualized communication system. Once this information has been collected and analyzed, the practitioner should have valuable information regarding the functions about which the student communicates. Furthermore, the practitioner will have information regarding the student's current means of communication for each primary function. This information can aid the practitioner in making decisions about at least the following elements in order to establish a functional communication system:

1. basic vocabulary which should be taught so that the student can express the primary functions. For example, consider a non-verbal student who communicates regularly but often "inappropriately" in order to request food, assistance, and affection; to express protest/refusal; to express frustration; and to comment about events/actions. If an augmentative communication system is designed, it would make sense to include in the initial vocabulary items such as food preferences; "help!"; "hug", "tickle", "kiss", "handshake", etc., depending on the student's age; "stop!", "go away", etc.; and words related to preferred events (e.g., "zoo", "store", "videogame", etc.). Especially for students with autism, who often have very limited behavioral repertoires, this information may not be obvious unless a detailed analysis of communicative function is undertaken over time.

2. information related to teaching strategies. The contextual information considered in forming hypotheses regarding the functions of behavior can be directly applied in the teaching situation. Because of the serious generalization difficulties experienced by most students with autism and other severe handicaps (Donnellan & Mirenda, in press), it is crucial for communication training to be carried out in natural, relevant situations. The ideal occasions for teaching a student to use his new communication system to request "help!", for example, are during the naturally-occurring times when he actually needs help--not during isolated 1:1 "language times". Since the practitioner was required to attend to and identify such contexts in the process of forming functional hypotheses, he or she is now quite prepared both to anticipate the situations in which the student will need to communicate, and to provide instruction accordingly.

FIGURE 3. FLOW CHART FOR PLANNING AND IMPLEMENTING AN INTERVENTION BASED ON THE ANALYSIS OF COMMUNICATIVE FUNCTIONS OF BEHAVIOR



Behavior Management Strategies

The information gathered by using the tool can be directly translated into programs designed to decrease the frequency of behaviors considered to be socially inappropriate. The strategies used will most often involve antecedent interventions, differential reinforcement approaches, or other types of contingency management programs designed to teach replacement behaviors. The goals of the intervention are:

a) to re-structure the environment or curriculum to preclude the student's needing to communicate certain functions (e.g., protest, boredom, cessation); and

b) to replace the topographically aberrant behaviors with more appropriate behaviors which serve the same function.

Environmental/curricular strategies. This type of intervention should almost always be considered before (or, at least, in conjunction with) behavioral replacement strategies. The strategy involves a careful consideration of the student's environment and individual curriculum in light of the functional analysis of behavior. This is considered to be a critical step before implementation of a behavior management program, because "...in a ...setting which does not have effective programming, one of the most fruitless tasks one can engage in is to directly address the many behavior problems that exist. Such a battle is unending.... Oftentimes, the establishment [of an effective curriculum] acts in itself to reduce many of the undesired behaviors" (LaVigna & Donnellan-Walsh, 1976, p. 29-30).

A pragmatic analysis of behavior conducted by using a tool such as the one presented here provides the practitioner with considerable information related to necessary environmental/curricular changes. For example, if it has been found that self-stimulation seems to be consistently associated with boredom for a particular student, the curriculum may need to be revised to decrease the amount of "dead time" and to provide more relevant, stimulating activities. If tantrums, aggression and/or self-injurious behavior in another student seem consistently related to frustration, a desire for task cessation, and protest, the practitioner ought to make the "least dangerous assumption" (Donnellan, in press) and assume that a reconsideration of instructional methods, functional relevance of tasks, and the reinforcement value of activities is in order. Other alterations, such as revising the classroom schedule to allow more time for students to acquire replacement behaviors in context, may also be indicated, especially for students who regularly use their aberrant behavior to seek and request attention or interaction.

Too frequently, communications of this nature are ignored by educators, largely because they may believe that students have no right to either give feedback about or attempt to regulate the nature of their educational experiences. When students with autism, in particular, fail to progress either academically, adaptively, or behaviorally, the blame for this failure is usually placed on the student or his family--but rarely on either the

practitioner, the educational environment, or the curricular content (Donnellan, in press). An analysis of communicative function can assist the practitioner to identify the source of instructional failure, at least in cases where such failure produces communicative behavior on the part of the student.

Behavioral replacement strategies. In the context of the position taken here, interventions must simultaneously preserve communicative intent while altering behavioral means, in order for them to be considered effective in both a pragmatic and a behavioral sense. The primary techniques which can be used in this regard are: differential reinforcement of other behavior (DRO); shaping; and direct instruction regarding new, more appropriate behaviors (see LaVigna & Donnellan; in press, for an extensive presentation of these procedures). The latter technique involves teaching replacement behaviors, via a verbal or an augmentative communication system (Durand, 1982), and is therefore directly related to the "communication training strategies" discussed previously. This option would be preferable when dealing with students who have few, if any, appropriate behaviors in their repertoire. On the other hand, the first two strategies mentioned both involve differential reinforcement, either to increase the frequency of occurrence of already-existing behaviors or to modify the intensity of the aberrant behaviors down to more acceptable levels. These techniques are based on sound behavioral principles and at the same time allow the practitioner to modify behavior while acknowledging the legitimacy of its communicative content. Thus, aberrant behaviors are not simply eliminated but are replaced or changed with the communicative function intact.

A Case Study Example

The case of a 7-year-old student with autism, Celia, is offered to illustrate the pragmatic analysis of behavior. The personnel in Celia's classroom became increasingly concerned about several inappropriate behaviors which she was exhibiting. These included screaming, crying, whining, and perseverative talking about imagined injuries. On occasion, these behaviors would escalate to physical aggression to herself or to others, including slapping, pinching and hitting. The behaviors occurred on an average of 35 times per day for two to three minutes each time, and occurred in a variety of environments, including the student's home.

An operant analysis of the behavior was first undertaken. It appeared that the behavior was exhibited primarily when demands were made of the student or when a desired activity was prohibited or terminated; however, the behaviors occurred for no apparent reason at least 50% of the time. At times, the school staff would attend or concede to Celia when the behaviors occurred, and at other times she was ignored. Thus, the reinforcement history of the behavior apparently involved intermittent reinforcement of the undesired responses. It was hypothesized that the behavior was attention-seeking, and a combination program of DRO (LaVigna & Donnellan-Walsh, 1976) and extinction (Martin & Pear, 1978) was chosen for intervention. The staff differentially and regularly reinforced Celia for short periods of time during which the target behaviors did not occur. Additionally,

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when the behaviors did occur, the staff made efforts not to attend to them.

After several weeks, the program effectiveness was evaluated (see Figure 4). On the average there was no reduction in the frequency of the behavior either in school or at home. After reconsideration, a pragmatic analysis of the behavior was undertaken, using the tool described here. It was hypothesized that Celia used the behavior primarily as a request for social interaction; in fact, the majority of the apparently-random incidents seemed to fall in this category. In addition, it served comment, request, and assistance functions. When the behaviors were viewed as communicative acts, it became clear that Celia had no other means of initiating interactions except to engage in the behaviors of concern. The behavioral topographies were inappropriate, but the communication functions that were being served were appropriate and desirable.

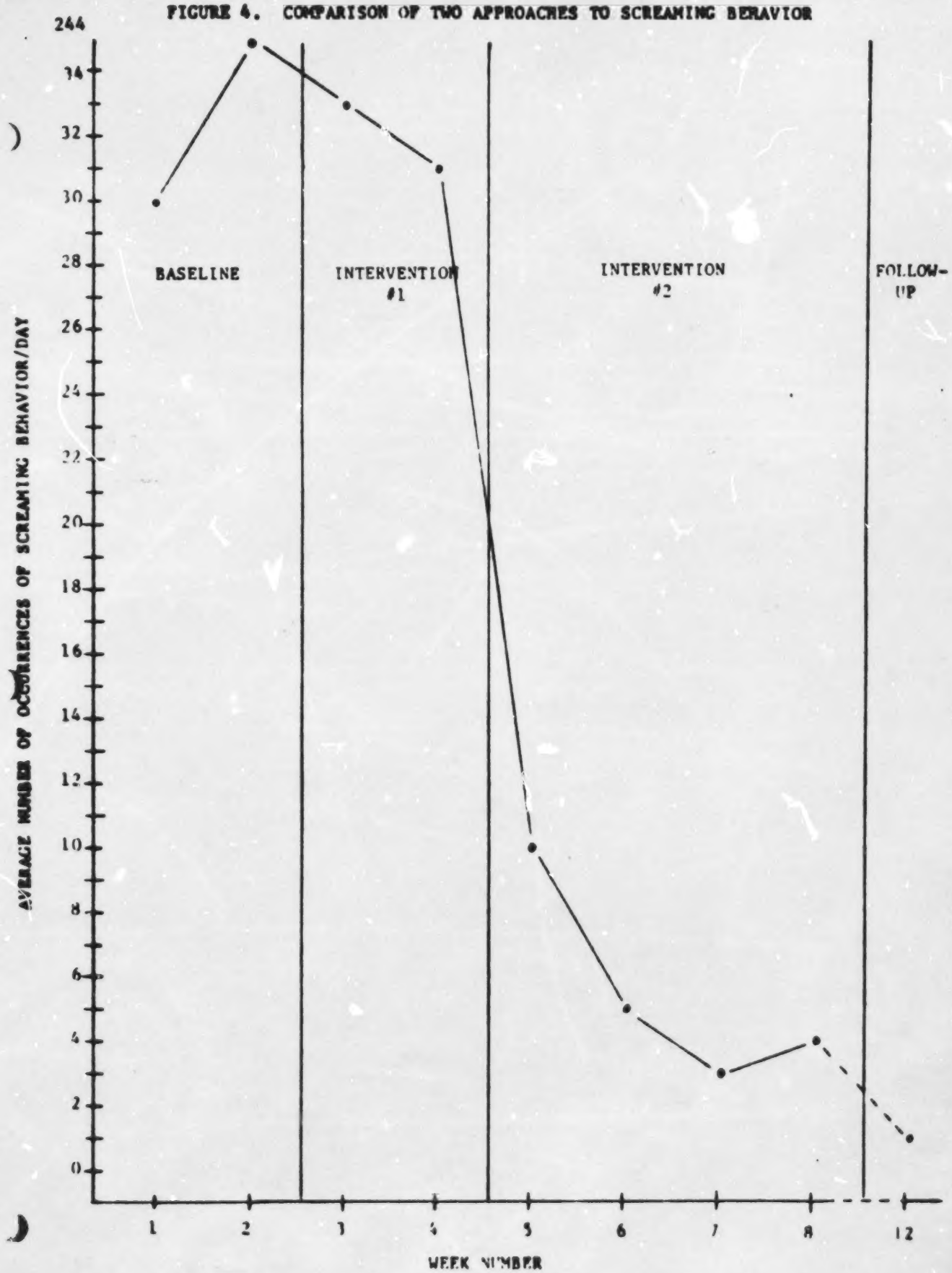
Based on this analysis, the staff decided to institute an intervention aimed at modifying the behaviors while preserving their functions. Therefore, all of Celia's targeted inappropriate behaviors were treated as appropriate communicative acts. The school staff paid close attention to antecedent behaviors which signalled an impending scream, and responded by saying, for instance, "Is something wrong?" or "Oh, do you want to play/talk with me now?" or "You need to use words to tell me what the problem is." In addition, initiative behaviors which were socially appropriate were differentially reinforced and highlighted; for example, "That was great, Celia--you called my name to ask for help. You didn't scream." The staff also frequently reminded Celia of the appropriate ways to request interaction or to make comments.

Within two weeks, the frequency of inappropriate behavior decreased from 35 incidents per day to 3 or 4 per day, and the duration had decreased to 10-15 seconds per episode. In addition, parent reports indicated a similar reduction at home after the program was instituted there.

Conclusion

This paper has described the need for a pragmatic approach to behavioral analysis, with particular emphasis on the necessity for determining the communicative functions of behavior. A simple tool to use in conducting such an analysis has been presented, along with some suggestions for planning interventions based on the information generated. This strategy is not meant to replace sound behavioral methods and interventions. Instead, it encourages the practitioner to consider the behaviors of autistic and other severely handicapped students in a communicative context, and to develop innovative educational approaches for teaching functional communication and managing undesired behavior in this light.

FIGURE 4. COMPARISON OF TWO APPROACHES TO SCREAMING BEHAVIOR



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Appendix 1

Definitions of Behavioral Categories

Aggression:	Behavior, either physical or verbal, which results in discomfort/harm/pain to persons/objects/physical environment.
Bizarre verbalizations:	Behavior which consists of unconventional sounds emitted from the mouth/nose which are not words or parts of words.
Inappropriate oral/anal behavior:	A behavior involving the mouth and/or anus which is socially unacceptable (i.e., licking objects and smearing).
Perseverative rituals:	A patterned set of repetitive behaviors occurring in the same sequence.
Self-injurious behavior:	A behavior characterized by actions directed at one's own body which cause physical damage either immediately or over time (i.e., head banging).
Self-stimulation:	Stereotypic behaviors which can be kinesthetic (rocking) and/or tactile (finger flicking), visual (twirling an object in front of one's eyes) or auditory (vocal noises). They do not necessarily occur in the same sequence or pattern.
Tantrum:	A cluster of aggressive behaviors which occur over a period of time and are not necessarily directed at a person/object. Two or more of the following usually occur together: screaming, hitting, biting, kicking, throwing, or destroying objects in the environment.
Gaze aversion:	Behavior which consists of a failure to look at a person or object or to maintain visual attention requested or expected, based on social norms.
Gazing/staring:	Behavior in which the eyes are focused on a particular object or person for a prolonged length of time.
Pointing:	A behavior in which the student indicates the location of a person/object using the hands or arms.

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Gesturing:	A behavior characterized by a motion of the limbs or body to express or help express a particular message. The motions are not part of a formal manual language system.
Hugging:	A behavior in which the student clasps or clings to another person with his/her arms.
Kissing:	A behavior in which the student touches a body part, person or object with his/her lips.
Masturbation:	A behavior which consists of self-stimulation of the genital organs.
Object manipulation:	A behavior in which a student moves or uses an object non-aggressively.
Proximity/positioning;	Behavior in which a student positions him/herself near or next to someone or something.
Pushing/pulling:	A behavior in which a student moves or attempts to move an object/person through physical contact.
Reaching/grabbing:	A behavior in which a student grasps or attempts to grasp an object or person.
Running:	A behavior involving movement on foot at a pace faster than a walk.
Touching:	A behavior which is characterized by non-aggressive physical contact which does not change the disposition or orientation of the person/object.
Facial expression:	A behavior characterized by movements of the facial musculature that express or help to express a particular message.
Laughing/giggling:	A behavior consisting of a series of inarticulate sounds with the mouth open in a wide smile.
Scream/yell:	A behavior characterized by long, loud piercing vocalizations.
Swearing:	A behavior characterized by the use of profane or vulgar verbalizations.
Verbal/physical threats:	A behavior consisting of actions or vocalizations which suggest the possibility of aggression.

Whining/crying:	Vocal behaviors using a childish, annoying voice pattern/intonation. Vocal behaviors characterized by inarticulate sobs or low plaintive calls.
Delayed echolalia:	Behavior consisting of a verbal repetition of a past heard utterance such as a story, song, sentence, etc. The repetition may be only partial.
Immediate echolalia:	Behavior consisting of a verbal repetition of an utterance (sentence, story, song, etc.) that has just been made by another person. The repetition may be only partial.
Picture/written word:	Behavior in which the sender utilizes a written word card, picture card, Blissymbol or flashcard of any type.
One word sign/approximation:	A motor behavior in which the sender utilizes a manual movement that is representational in nature and is part of a formal manual language system, e.g., American sign language.
Complex sign/approximations:	Behavior that includes more than one representational manual movement, as above.
One word speech/approximation:	A behavior which consists of a representational vocal/verbal utterance. The approximation may be a partial word such as "ba" for ball or "wa" for water.
Complex speech/approximation:	A behavior which consists of representational vocal/verbal utterances that are more than one word structures.

Appendix 2

Definitions of Functional Categories

I. Interactive Functions

A. Requests: Expressed Desires

for attention	behaviors used to call attention to sender (e.g., showing off, teasing, flirting, etc.)
for social interaction	behaviors used to initiate a social exchange
for play interactions	behaviors that convey a specific desire on the part of the sender to engage in play with another person
for affection	behaviors that direct the receiver to engage in some physical activity specifically intended to convey a feeling of fondness.
for permission to engage in an activity	behaviors that convey a desire on the part of the sender to engage in a particular action (e.g., bathroom, watch TV, etc.)
for action by receiver	behaviors that direct the receiver to cause an event to occur
for assistance	behaviors that specifically direct the receiver to provide help
for information/clarification	behaviors that specifically direct the receiver to provide information or clarification about an object, action, activity, location, etc.
for objects	behaviors that direct the receiver to provide an object to the sender (other than food)
for food	behaviors that specifically convey a desire for food or drink

B. Negations: Rejection of stimulus events

protest	behaviors which express general objection to or disapproval of an event, request, etc.
refusal	behaviors which specifically express rejection of an event initiated or suggested by another
cessation	behaviors which specifically express a desire to terminate an event which has already begun

C. Declaration/Comment: The verbal and non-verbal expression of fact or opinion

about events/actions	behaviors which are used to comment on an event or occurrence (past, present or future)
about objects/persons	behaviors used to comment about an object including food, or about a person (e.g., compliments)
about errors/mistakes	behaviors which convey acknowledgement that the sender or another person has committed an error
affirmation	behaviors which convey agreement about or willingness to engage in an event or action
greeting	behaviors which occur subsequent to a person's entrance or appearance and express recognition
humor	behaviors intended to entertain the receiver and/or to evoke a response such as laughter

D. Declarations about Feelings:

anger	includes behaviors whose primary purpose is to convey rage, annoyance, displeasure
anticipation	includes behaviors whose primary purpose is to convey strong, positive feelings regarding a future event

boredom	includes behaviors whose primary purpose is to convey disinterest, satiation, lack of motivation, etc.
confusion	includes behaviors conveying the message that the sender is in a state of disorder or bewilderment
fear	includes behaviors whose primary purpose is to convey reluctance to act upon, participate in, or view an event because of expectation of pain or danger
frustration	includes behaviors conveying the message that the sender is unable to accomplish an objective
hurt feelings	includes behaviors conveying that the sender feels offended, etc.
pain	includes behaviors conveying that the sender feels physical discomfort
pleasure	includes behaviors conveying a message of happiness, enjoyment, etc.

II. Non-Interactive Functions

A. Self-regulation	behaviors used for the purpose of monitoring one's own behavior (e.g., self-control, self-correction)
B. Rehearsal	behaviors used to practice an event that has not yet occurred
C. Habitual	behaviors set by regular repetition in a predictable sequence
D. Relaxation/Tension Release	behaviors used for the purpose of self-entertainment or to calm oneself.